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U.S. PATENT APPLICATION

Inventor(s): Simon ORMEROD
Jean-Marc BERNARD
Francis PERIN

Invention: LINEAR PERSONALIZATION MACHINE

***NIXON & VANDERHYE P.C.
ATTORNEYS AT LAW
1100 NORTH GLEBE ROAD
8TH FLOOR
ARLINGTON, VIRGINIA 22201-4714
(703) 816-4000
Facsimile (703) 816-4100***

SPECIFICATION

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LINEAR PERSONALIZATION MACHINEFIELD OF THE INVENTION

The present invention relates to a linear personalization machine.

BACKGROUND OF THE INVENTION

5 Personalization machines of the prior art are made up of a rotating platform comprising a plurality of connection devices each associated with a card from a plurality of memory cards. These personalization machines are arranged in a card processing line comprising a
10 unstacking device, an electric testing station, two ejection stations, a turnover station, an ink marking station and a stacking station. When in operation, the unstacking device ejects a memory card at regular intervals onto a transfer system (3) for portable
15 objects. At the electric testing station the quality of the electronic chips for the cards is checked. Any faulty memory cards are expelled from the processing line system while valid cards are routed towards the personalization station. Personalization consists of entering
20 instructions and/or information into each memory card which are particular to the card or particular to the application. This information is entered either via magnetic waves into contactless cards or via pins into contact cards, or for mixed-type contact and contactless
25 cards by either one or by both of these insertion means. After personalization, the faulty cards are ejected by a further ejection station, while non-faulty cards are optionally returned to be ink or laser marked recto verso, then stacked at a stacking station. A computer
30 system manages the personalization of all the cards. A

personalization machine of this type is disclosed by patent application FR 96 03410 filed by the same applicant.

OBJECTS AND SUMMARY OF THE INVENTION

- 5 The purpose of the present invention is to provide a linear personalization machine of simpler, less costly construction.

This linear personalization machine may easily be adapted in lieu and stead of a conventional
10 personalization machine. Also, this personalization machine is more compact as it takes up less space on a card processing line. With this advantage, card processing lines of shorter length can be built.

This purpose is attained through the fact that
15 the linear personalization machine, comprising a transfer system for portable objects, incorporating an integrated circuit, is characterized in that it comprises a personalization elevator that is translated vertically and sequentially on a guide support by driving and
20 positioning means, said elevator being made up of a parallelepiped plate fitted with a plurality of connection devices, of mixed or unmixed type, connecting to the integrated circuit of the portable objects, that are brought in sequential manner in front of an
25 incoming/outgoing station on the transfer line.

According to one particular aspect of the present invention, said guide support is made up of
parallelepiped plate whose length is approximately equal to twice the length of said personalization elevator, and
30 comprises a vertical slit, two vertical rails and two pulleys joined together by a belt.

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According to another particular aspect, the driving and positioning means are made up of a means to hold and slide said elevator on said rails of said guide support, a driving fixation fixing the elevator firmly to the belt of the guide support, the vertical slit of the guide support forming a track for the driving fixation of said elevator, the driving and positioning means also enabling each fixed platform to be brought to a halt level with the portable objects in the alignment of said transfer system for portable objects.

According to a further particular aspect, said belt of said guide support is periodically set in motion by an electric motor or other power means such that the up and down movements of said elevator along the guide support are regularly interrupted at the level of the incoming/outgoing position on the transfer line so as to allow loading and unloading of the portable objects.

According to another particular aspect, the driving fixation located in the center of said parallelepiped plate comprises means, at its end point, for anchoring to said belt of said guide support.

A further purpose of the invention is to provide a faster personalization machine. This purpose is reached through the fact that the linear personalization machine comprises a decoder package connected to each first parallel port of each personalization card by an address bus and a data bus, said personalization cards being connected in parallel to a backplane computer via a second parallel port. The form of the present personalization machine combined with a new device means that said personalization information can be sent in parallel.

A third object of the invention is to provide a personalization machine which is able to test the electric quality of an electronic chip or the quality of a magnetic strip of a portable object both before and after its personalization. With this personalization machine it is also possible to re-launch card personalization automatically whenever personalization is faulty.

This purpose is achieved through the fact that the connection devices can test the electronic chips and activate the electric contacts and/or contactless terminals of said portable objects.

According to one particular aspect of the invention, when the connection devices have detected a faulty portable object, the latter is expelled from said elevator before its personalization.

According to another particular aspect, the personalization machine comprises computer means for personalization control and management.

According to another particular aspect, said means for personalization control and management trigger a substitution sequence whenever a personalization defect on a portable object is signaled.

According to another particular aspect, the connection devices test the quality of the personalization of the portable objects and signal any personalization defects to the control and management means.

According to a further particular aspect, an ejection station located at the exit of said personalization machine tests the quality of personalization of the portable objects and signals any

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personalization defects to the control and management means.

Other particular aspects and advantages of the present invention will be clearer understood on reading the following description with reference to the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

- figure 1 shows a side view of a personalization elevator

10 - figure 2 shows a front view of a guide support according to the invention,

- figure 3 shows a side view of a guide support according to figure 2,

15 - figure 4 shows a side view of the linear personalization machine in a card processing line

- figure 5 shows a front view of the personalization machine according to figure 4,

20 - figure 6 shows a diagram of the electronic circuits required for the personalization of contact, contactless, or mixed-type cards.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The invention which is to be disclosed in connection with figures 1 to 6 comprises a table (1) on which is arranged a card processing line. Figure 5 shows a front view of a processing line successively comprising an unstacking station (9), at which the cards are stored in a pile prior to their personalization, a linear personalization machine (10) an ejection station (6) which tests the cards and expels faulty cards from the processing line, and finally a stacker (5) of personalized cards. A transfer system (3) allows the

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memory cards to be taken from one station to another. It is formed by a continuous notched belt (31) circulating between two pulleys (33, 32) driven by a motor (30). On this endless belt (31) stops are mounted to hold the cards in place during their transfer to permit their extraction and depositing by each of the personalization heads (22i, 22n) of the elevator.

The personalization machine comprises a personalization elevator translated vertically over a guide carrier (70) by driving and positioning means.

The personalization elevator (20) shown in figure 1 is made up of parallelepiped plate (23) provided on one of its surfaces, having the greatest surface area, with a plurality of connection devices forming personalization heads (22i, 22n) and, on its opposite surface, with a driving fixation (28) and sliding guide means (24), for example lateral means, for guiding by sliding in a rail. These sliding guide means may for example be made up of a runner.

Personalization may be made using so-called "chip" cards or "integrated circuit" cards, whose integrated circuit is connected to the outside world either by contacts whose contact areas are each connected by conductors to the entry points of the integrated circuit, or by an antenna. In this case, the card is a so-called "contactless" card and communicates by Hertzian waves or electromagnetic waves with another antenna connected either to a terminal or to the personalization machine. Or the card may be of mixed type comprising both a connection means by contact with a terminal or to the personalization machine and contactless connection means to the terminal or personalization machine. Therefore, through the use of contacts (225) of the connection head

(224) or through the use of the antenna (2271) of the fixed platform (227) the personalization machine is able to personalize contact cards, contactless cards or mixed-type cards. Each connection device (22i) therefore
5 comprises a fixed platform (227) integral with plate (23) and a connection head (224).

Figures 2 and 3 show a front and side view of the guide support (70). It is made up of a parallelepiped plate (71) whose length is approximately equal to twice
10 the length of the personalization elevator (20). Said plate (71) comprises, at its center, a vertical slit (72) that is sufficiently wide to allow entry of the driving fixation (28) of elevator (20). The length of slit (72) is approximately equal to the length of the
15 personalization elevator (20) such that elevator (20) can slide from top downwards over the entire surface of the guide support (70). Also, two vertical rails (73) are arranged on the surface (710) having the greatest surface area of plate (71). And surface (720) of plate (71)
20 parallel to surface (710) comprises two pulleys (74) joined together by belt (75).

When in operation, personalization elevator (20) is translated vertically on guide support (70). For this purpose, driving fixation (28) of elevator (20) is
25 inserted in slit (72) of the guide support and is then firmly anchored to belt (75). Finally, belt (75) of said guide support (70) is set in motion by means of an electric motor or other power means. Belt (75) when moving causes driving fixation (28) to move, said slit
30 (72) forming a track for driving fixation (28). Consequently, via belt (75) and driving fixation (28) the power means moves the elevator along the guide support. The motor supply is periodically cut off when the fixed

platform (227) of a connection device (22i) that is free or respectively engaged is level with the portable objects (4) located in transfer system (3) such as to allow their respective loading and unloading on or off personalization elevator (20).

Connection devices (22i) comprise a fixed platform (227) integral with parallelepiped plate (23) and a mobile element (221) carrying a connection head (224). With each connection head (224) and each fixed platform (227) of a connection device (22i, 22n) a personalization card (21i, 21n) is associated, positioned in a personalization rack by a connection cable (29). As shown in figure 6, each connection head (224) comprises a plurality of pins (225) mounted on elastic means and electrically connected to a connector (2241) which ensures connection to a wire sheet (254) connected by another connector (253) to a decoder package (250) for addressing and routing data towards the head whose address corresponds to the one transmitted on the address bus. Fixed platform (227) is in non-conductor material such as a plastic material and, embedded in its mass, comprises a transmission and reception antenna (2271) which is connected by a connector (2272) and a wire (255) to a second connector (252) of decoder package (250). This package comprises an antenna interface circuit (251) and is connected to the electronic personalization boards by an address bus (257) and a data bus (256). Address bus (257) and data bus (256) forming cable (29) are connected to the personalization boards (21i) by a parallel port (216). One bus (210) of the personalization board is also connected to the parallel port (216). Bus (210) is also connected to a microprocessor of the personalization board which executes the personalization program of the electronic cards, which program is loaded in a memory

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(213) of board (21i). Finally the microprocessor also has access, via bus (210) and connector (214) connected to this bus (210) to a security memory card (4s) so-called "mother" card whose function is to provide the security information needed for personalization. Finally, bus (210) of each board is connected by a parallel port (215) to a backplane computer (241). Another computer of P.C. type (243) having a parallel connection with the first computer manages machine control and receives information from the positioning and detection devices such as, for example, the device ensuring the positioning of a chip card to be personalized on the fixed platform (227) of a connection device. The personalization program loaded in the memory (213) recognizes card types and has an algorithm and the necessary instructions to address information to the connection devices (22i, 22n) by connector (253) and (252) respectively which correspond to contact cards and contactless cards respectively. For mixed-type cards decoder package (250) will give access to the card via contact connector (253) for personalization of some so-called "non-security" parts and will access the card via connector (252) connecting with the antenna to transmit security information via the contactless part. This security information is taken from a "mother" security card (4s) by connector (214) during the personalization of so-called "security" functions or applications. Therefore, the personalization program will comprise means of selectively addressing information towards either one of the connectors.

When in operation, the memory or chip cards are loaded from the transfer system (3) onto fixed platform (227) of the connection devices using an already known card loading and unloading device. Said device, for example of jack type, permits proper positioning of each

card on the fixed part (227) of connection device (22i). For more details on the card loading and unloading device reference can be made to patent application FR 9803410 filed by the same applicant. When a card (4i) is loaded
5 on the fixed platform (227) of the connection device (22i), elevator (20) respectively moves up or down over a distance equal to the distance separating two contiguous connection devices (22i, 22j) and another chip card (4j)
10 is loaded onto fixed platform (227) of the following connection device (22j). These respective stages of upward and downward movement and of card loading are repeated until all the connection devices are loaded. Then elevator (20) moves down, respectively moves up,
15 such that the first connection device is level with the transfer line. The first card (4i) which was loaded in the elevator is unloaded from the fixed platform (227) of connection device (22i) onto the transfer line and a new chip card to be personalized is loaded on connection
20 device (22i). During the personalization phase of this new chip card, elevator (20) moves down, respectively moves upwards, over a distance equal to the distance separating the two contiguous connection devices and a new unloading phase of a personalized chip card and loading of a non-personalized chip card begins.

25 According to another embodiment of the invention, the mixed-type connection device of the personalization elevator comprises an electrical testing device which tests the memory or chip cards as soon as they arrive on the fixed platform (227). If the loaded memory or chip
30 card is faulty, it is directly unloaded from the elevator (20) onto transfer system (3) then expelled by the ejection station (6) and the personalization elevator is loaded with a new memory or chip card. If this card is

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valid, the elevator moves up or down such that a new chip card may be loaded on the following fixed platform.

Other modifications within the reach of persons skilled in the art also come under the spirit of the
5 invention.

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